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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,464	08/03/2001	Bradford A. Ritter	10015867-1	7032

7590

03/24/2004

HEWLETT-PACKARD COMPANY
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EXAMINER

YANG, RYAN R

ART UNIT	PAPER NUMBER
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2672

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/921,464

Applicant(s)

RITTER, BRADFORD A.

Examiner

Ryan R Yang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

1. This action is responsive to communications: Amendment, filed on 12/24/2003.
This action is final.
2. Claims 1-31 are pending in this application. Claims 1, 17 and 27 are independent claims. In the Amendment, filed on 12/24/2003, claims 1-6, 9-10, 12 and 14-16 were amended.
3. The present title of the invention is "System and method for performing texture synthesis" as filed originally.

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1-10, 14, 17-20, 23, 25 and 27-31 are rejected under 35 U.S.C. 102(a) as being anticipated by Wei et al. (SIGGRAPH 2000 Conference Proceedings pg. 479-488).
6. As per claim 1, Wei et al, hereinafter Wei, discloses a method for synthesizing a texture of a desired size from a sample texture, said method comprising:

generating a matrix of said desired size (Gs where Gs is a Gaussian matrix, page 483 Section 2.6; Gs is built from /s which are a plurality of texture samples with a size, page 481 Section 2);

providing values to said matrix, wherein said values comprise random values (G_s is a Gaussian matrix, therefore the elements are random values) and wherein at least a portion of said values represents a desired structure according to which graphical features of a synthesized texture are to substantially conform (I_s which are a plurality of texture samples with a size, page 481 Section 2, since G_s is built from I_s , it is substantially conformed to I_s); and

executing a texture synthesis process that utilizes said matrix to generate a synthesized texture of said desired size having graphical features arranged therein substantially in conformance with said desired structure (**function** I_s is a texture synthesis process, where G_s is the desired size, page 483 section 2.6).

7. As per claim 2, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses providing comprises:

providing constant values to said matrix that represent said desired structure ($G_s \leftarrow \text{BuildPyramid}(I_s)$ where I_s are a plurality of constants).

8. As per claim 3, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses providing comprises:

providing constant values to said matrix that are arranged therein to represent said desired structure ($G_s \leftarrow \text{BuildPyramid}(I_s)$ where I_s are a plurality of constants).

9. As per claim 4, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses providing comprises:

populating said matrix with values from a pre-existing file (I_a is the pre-existing texture sample from a file).

10. As per claim 5, Wei demonstrated all the elements as applied to the rejection of dependent claim 4, supra, and further discloses:

randomizing said values from said pre-existing file ($G_s \leftarrow \text{BuildPyramid}(I_s)$ is a randomizing process).

11. As per claim 6, Wei demonstrated all the elements as applied to the rejection of dependent claim 5, supra, and further discloses randomizing further comprises:

randomizing said values from said pre-existing file to a user-specified degree ($G_s(L)$ by setting L the resolution level, the degree of randomization can be set).

12. As per claim 7, Wei demonstrated all the elements as applied to the rejection of dependent claim 4, supra, and further discloses values from said preexisting file are nearly the desired result but are not tileable (since the input textual data is not yet randomized, it is not tileable).

13. As per claim 8, Wei demonstrated all the elements as applied to the rejection of dependent claim 4, supra, and further discloses values from said pre-existing file include said at least a portion of values that represent said desired structure, but wherein said matrix having values from said pre-existing file is not readily tileable (since the input textual data is not yet randomized, it is not tileable).

14. As per claim 9, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses executing said texture synthesis process further comprises:

(a) selecting a value from said matrix (selecting (X_s , Y_s), page 483, **function** I_s , line 5);

(b) determining a first neighborhood of the selected value from said matrix ($Ns \leftarrow \text{BuildNeighborhood}(Gs, L, Xs, Ys)$, page 483, **function C**, line 1); and

(c) comparing said first neighborhood to neighborhoods of said sample texture to determine an optimal value of said sample texture (**function C**, line 5-6, page 483).

15. As per claim 10, Wei demonstrated all the elements as applied to the rejection of dependent claim 9, supra, and further discloses:

(d) repeating (a)-(c) for each value of said matrix (**function Is**, line 5, page 483).

16. As per claim 14, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses said providing comprises providing pixel values to said matrix ($Gs \leftarrow \text{BuildPyramid}(Is)$ where Is are a plurality of constants).

17. As per claim 17, Wei discloses a system for generating a synthesized texture from a sample texture, said system comprising:

a first data structure defining said sample texture of a first plurality of values (Gs where Gs is a Gaussian matrix, page 483 Section 2.6; Gs is built from Is which are a plurality of texture samples with a size, page 481 Section 2);

a second data structure defining a texture of a second plurality of values, wherein at least a portion of said values of said second data structure are random (Gs is a Gaussian matrix, therefore the elements are random values) and wherein at least a portion of said values of said second data structure represent a desired structure according to which graphical features are to substantially conform (Is which are a plurality of texture samples with a size, page 481 Section 2, since Gs is built from Is , it is substantially conformed to Is); and

a texture synthesis algorithm, said texture synthesis algorithm being operable to utilize at least said first data structure and said second data structure to generate a synthesized texture having graphical features arranged therein in substantial conformance to said desired structure (**function** f_s is a texture synthesis process, where G_s is the desired size, page 483 section 2.6).

18. As per claim 18, Wei demonstrated all the elements as applied to the rejection of independent claim 17, supra, and further discloses said first data structure is of a first size and wherein said second data structure is of a second size (f_s is a first size and G_s is the second size, page 483 section 2.6).

19. As per claim 19, Wei demonstrated all the elements as applied to the rejection of independent claim 17, supra, and further discloses at least a portion of said values of said second data structure comprises:

constant values arranged in said second data structure to represent said desired structure ($G_s \leftarrow \text{BuildPyramid}(f_s)$ where f_s are a plurality of constants).

20. As per claim 20, Wei demonstrated all the elements as applied to the rejection of independent claim 17, supra, and further discloses said second data structure is populated with values from a pre-existing file comprising said at least a portion of said values that identify said desired structure (f_a is the pre-existing texture sample from a file that identify said desired structure).

21. As per claim 23, Wei demonstrated all the elements as applied to the rejection of independent claim 17, supra, and further discloses said texture synthesis algorithm is

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operable to transform said second data structure into said synthesized texture ($G_s \leftarrow \text{BuildPyramid}(I_s)$ is a transforming process).

22. As per claim 25, Wei demonstrated all the elements as applied to the rejection of independent claim 17, *supra*, and further discloses wherein said texture synthesis algorithm is further operable to

select a value from said second data structure (selecting (X_s, Y_s) , page 483, **function** I_s , line 5),

determine a first neighborhood of the selected value from said second data structure ($N_s \leftarrow \text{BuildNeighborhood}(G_s, L, X_s, Y_s)$, page 483, **function** C, line 1),

compare said first neighborhood to neighborhoods of said first data structure to determine an optimal value of said first data structure, and assign said optimal value to the selected value of said second data structure (**function** C, line 5-7, page 483).

23. As per claim 27, Wei discloses a system for synthesizing a texture of a desired size from a sample texture, said system comprising:

code for generating a matrix of said desired size (G_s where G_s is a Gaussian matrix, page 483 Section 2.6; G_s is built from I_s which are a plurality of texture samples with a size, page 481 Section 2);

code for initializing said matrix with a plurality of values, wherein at least a portion of said values are random (G_s is a Gaussian matrix, therefore the elements are random values) and wherein at least a portion of said values represent a desired structure according to which graphical features are to be arranged (I_s which are a plurality of

texture samples with a size, page 481 Section 2, since Gs is built from Is, it is substantially conformed to Is); and

code for generating a synthesized texture of said desired size having graphical features arranged therein according to said desired structure (**function** /s is a texture synthesis process, where Gs is the desired size, page 483 section 2.6).

24. As per claim 28, Wei demonstrated all the elements as applied to the rejection of independent claim 27, supra, and further discloses initializing said matrix further comprises:

code for providing constant values to said matrix arranged therein to identify said desired structure ($G_s \leftarrow \text{BuildPyramid}(/s)$ where /s are a plurality of constants).

25. As per claim 29, Wei demonstrated all the elements as applied to the rejection of independent claim 27, supra, and further discloses initializing said matrix further comprises:

code for populating said matrix with values from a pre-existing file (/a is the pre-existing texture sample from a file).

26. As per claim 30, Wei demonstrated all the elements as applied to the rejection of independent claim 27, supra, and further discloses generating comprises:

code for transforming at least a portion of said values of said matrix such that said matrix defines said synthesized texture ($G_s \leftarrow \text{BuildPyramid}(/s)$ is a transforming process).

27. As per claim 31, Wei demonstrated all the elements as applied to the rejection of independent claim 27, supra, and further discloses generating further comprises:

code for determining a first neighborhood of a selected value from said matrix (selecting (X_s, Y_s) , page 483, **function I**, line 5);

code for comparing said first neighborhood to neighborhoods of said sample texture to determine an optimal value of said sample texture ($N_s \leftarrow \text{BuildNeighborhood}(G_s, L, X_s, Y_s)$, page 483, **function C**, line 1); and

code for assigning said optimal value of said sample texture to the selected value of said matrix (**function C**, line 5-7, page 483).

Claim Rejections - 35 USC § 103

28. Claims 11-12 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wei et al. (SIGGRAPH 2000 Conference Proceedings pg. 479-488).

29. As per claim 11, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra.

Wei discloses a method of synthesizing an image. It is noted that Wei does not explicitly disclose said sample texture comprises a parametric texture map (PTM) texture, however, since PTM is a notoriously well known sub-class of texture map, it would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the method to parametric texture map in order to synthesize a well known sub-class of texture map.

30. As per claim 12, Wei demonstrated all the elements as applied to the rejection of dependent claim 11, supra, and further discloses providing texture values to said matrix ($G_s \leftarrow \text{BuildPyramid}(I_s)$ where I_s are a plurality of constants).

31. As per claim 21, Wei demonstrated all the elements as applied to the rejection of independent claim 17, supra.

Wei discloses a method of synthesizing an image. It is noted that Wei does not explicitly disclose said sample texture comprises a parametric texture map (PTM) texture, however, since PTM is a notoriously well known class of texture map, it would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the method to parametric texture map in order to synthesize a well known sub-class of texture map.

32. As per claim 22, Wei demonstrated all the elements as applied to the rejection of dependent claim 21, supra, and further discloses said first plurality of values comprise texel values ($G_s \leftarrow \text{BuildPyramid}(I_s)$ where I_s are a plurality of constants).

33. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wei et al. as applied to claim 1 above, and further in view of Gossett.

34. As per claim 13, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra.

Wei discloses a method of synthesize an image. It is noted that Wei does not explicitly disclose sample texture comprises a texture of a format selected from the group consisting of red-green-blue (RGB), red-green-blue-alpha (RGBA), color index, luminance, and luminance alpha, however, this is known in the art as taught by Gossett. Gossett discloses a method of texture synthesis using red-green-blue (RGB), red-green-blue-alpha (RGBA), luminance, and luminance alpha (column 5, Table 1).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Gossett into Wei because Wei discloses a method of synthesizing image and Gossett discloses the texture format can be described in said format in order to more rigorously describing a texture.

35. Claims 15, 16, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wei et al. as applied to claim 1 above, and further in view of Kent (4,601,055).

36. As per claim 15, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra.

Wei discloses a method of synthesize an image. It is noted that Wei does not explicitly disclose re-sizing said synthesized texture, however, this is known in the art as taught by Kent. Kent discloses a method of synthesizing image in which the synthesized image can be re-sized ("For objects of large area, all that would need to be done would be to continue constructing pyramid levels until the desired pixel size was reached, column 19, line 61-63).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kent into Wei because Wei discloses a method of synthesizing image and Kent discloses the synthesized image can be re-sized in order to achieve maximum contrast with the background.

37. As per claim 16, Wei demonstrated all the elements as applied to the rejection of independent claim 1, supra.

Wei discloses a method of synthesizing an image. It is noted that Wei does not explicitly disclose said desired size is not a power of 2, further comprising re-sizing said synthesized texture to a size that is a power of 2, however, this is known in the art as taught by Kent. Kent discloses a method of synthesizing image in which the synthesized image can be re-sized into a power of 2 ("The method is to construct a pyramid of images l_0, l_1, \dots, l_k . Here k is the level at which single pixels correspond to regions in the original image of about the right sizes (i.e., within the nearest power of two), column 19, line 64-67).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kent into Wei because Wei discloses a method of synthesizing image and Kent discloses the synthesized image can be re-sized in order to achieve maximum contrast with the background.

38. As per claim 24, Wei demonstrated all the elements as applied to the rejection of dependent claim 23, *supra*.

Wei discloses a method of synthesizing an image. It is noted that Wei does not explicitly disclose said second data structure has a size that is not a power of 2, and wherein said texture synthesis algorithm is further operable to re-size said synthesized texture to a size that is a power of 2, however, this is known in the art as taught by Kent. Kent discloses a method of synthesizing image in which the synthesized image can be re-sized in a power of 2 ("The method is to construct a pyramid of images l_0, l_1, \dots, l_k . Here k is the level at which single pixels correspond to regions in the original image of about the right sizes (i.e., within the nearest power of two), column 19, line 64-67).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kent into Wei because Wei discloses a method of synthesizing image and Kent discloses the synthesized image can be re-sized into within nearest power of 2 in order to achieve maximum contrast with the background.

39. As per claim 26, Wei demonstrated all the elements as applied to the rejection of independent claim 17, *supra*.

Wei discloses a method of synthesize an image. It is noted that Wei does not explicitly disclose the step of re-sizing said synthesized texture, however, this is known in the art as taught by Kent. Kent discloses a method of synthesizing image in which the synthesized image is can be re-sized ("For objects of large area, all that would need to be done would be to continue constructing pyramid levels until the desired pixel size was reached, column 19, line 61-63).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kent into Wei because Wei discloses a method of synthesizing image and Kent discloses the synthesized image can be re-sized into within nearest power of 2 in order to achieve maximum contrast with the background.

Response to Arguments

40. Applicant's arguments filed 12/24/2003 have been fully considered but they are not persuasive.

As per independent claims 1, 17 and 27, applicant alleges Wei does not disclose the limitation "providing values to said matrix, wherein said values comprise random values and wherein at least a portion of said values represents a desired structure according to which graphical features of a synthesized texture are to substantially conform". In reply, examiner notes Gs is a Gaussian matrix, therefore the elements are random values (page 481 section 2), and since Gs is built from Is, it is substantially conformed to a desired structure (see 2.3).

As per claims 11, 12, 21 and 22, applicant alleges Wei does not disclose the limitation "providing values to said matrix, wherein said values comprise random values and wherein at least a portion of said values represents a desired structure according to which graphical features of a synthesized texture are to substantially conform". In reply, examiner notes Gs is a Gaussian matrix, therefore the elements are random values (page 481 section 2), and since Gs is built from Is, it is substantially conformed to a desired structure (see 2.3).

In addition, applicant alleges the motivation to combine is circular in nature. In reply, examiner considers a parametric texture is a sub-class of texture map and would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the method to a well known sub-class of texture map.

As per claim 13, applicant alleges Wei does not disclose the limitation "providing values to said matrix, wherein said values comprise random values and wherein at least a portion of said values represents a desired structure according to which graphical features of a synthesized texture are to substantially conform". In reply, examiner notes

Gs is a Gaussian matrix, therefore the elements are random values (page 481 section 2), and since Gs is built from Is, it is substantially conformed to a desired structure (see 2.3).

In addition, applicant alleges the motivation to combine is improper. In reply, examiner considers since Gossett uses more parameters to describe a texture, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include Gossett's method of generating texture map in order to more rigorously describing a texture.

As per claim 15, applicant alleges lack of motivation to combine. In reply, examiner considers to achieve maximum contrast with the background is the motivation to combine.

Conclusion

41. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Inquiries

42. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Ryan Yang** whose telephone number is **(703) 308-6133**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Michael Razavi**, can be reached at **(703) 305-4713**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 305-47000377.

Ryan Yang
March 18, 2004


MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600